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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR NOVEMBER 1940

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ADMINISTRATION

Stuart Pinckney Dies

John Stuart Pinckney, assistant entomologist, of the research staff, at the Carlisle, Pa., laboratory, died suddenly in that city on the afternoon of December 12. Mr. Pinckney was born at Mt. Pleasant, S. C., on September 11, 1901, and was graduated from Clemson College in 1922. He was appointed to the entomological service on July 22 of that year and was assigned to the hessian fly investigations at Wichita, Kans., under J. R. Horton. He resigned from the service in November 1927 and was engaged in private business for a time, but was reinstated on January 21, 1929, with the title of assistant entomologist, and was detailed to the hessian fly investigations at Carlisle, under C. C. Hill. After the introduced pest Bruchus brachialis Fahr. became troublesome in the Carolinas in 1934, Mr. Pinckney was assigned to the investigation of this insect. He had made excellent progress with this problem but was still engaged on it at the time of his death.

Stuart Pinckney was a valuable, energetic research worker and a man of fine character who will be greatly missed in the service. He held a captain's commission in the infantry of the United States Reserve Corps and was deeply interested in military affairs. He was a descendant of Governor Charles Pinckney, of South Carolina,of Revolutionary War fame. He is survived by his wife, his parents, and one sister.

FRUIT INSECT INVESTIGATIONS

Causes of injury to peach trees.--A 1,600-mile trip taken in October by Oliver I. Snapp, of the Fort Valley, Ga., laboratory, through Virginia, West Virginia, Maryland, Pennsylvania, New Jersey, and Delaware, to investigate injury to peach trees revealed that winter injury, rather than the ethylene dichloride emulsion treatment for borer control, had probably been responsible for the condition of the trees in most of the orchards visited in which there were injured trees. The use of 85-percent stock emulsion of ethylene dichloride instead of the recommended 20-percent strength had definitely contributed to serious injury in 1 orchard. In 5 of the 50 orchards visited, improper manner of application of ethylene dichloride emulsion or failure to regulate the dosage may have caused injury or contributed to a condition initiated by winter injury.

Miscible ethylene dichloride unsatisfactory for peach borer control.--Mr. Snapp has reported on tests conducted this fall at Fort Valley with miscible ethylene dichloride, a commercially manufactured substitute for ethylene dichloride emulsion that recently appeared on the market. When diluted to application strength, the mixture was unstable, and layered very rapidly. Although the miscible ethylene dichloride gave very good control of the peach borer, it caused some injury to the trees. This may have been due to the rapid settling of the diluted material, which caused the last of the dose poured to be stronger than the first portion poured. The injury in most cases was to the outside bark layers, especially where there was an opening in the bark, and to crown galls. The miscible material caused very little cambium injury and, of 236 trees of various ages treated with miscible ethylene dichloride, only a stunted 3-year-old tree growing beside a hedgerow was injured sufficiently to cause death.

Fumigation of raisins in rolled paper trays.--Experimental fumigations of raisins in rolled paper trays, designed to kill infestations of the raisin moth (Ephestia figulilella Greg.) before larval feeding had caused much damage, were carried out by George H. Kaloostian, of the Fresno, Calif., laboratory. In former years raisins were dried on wooden trays. This method is still used extensively, especially for drying late-maturing Muscat grapes, but probably 75 percent of the leading variety, Thompson Seedless (Sultanina), is dried on trays of Kraft paper, 2 by 3 feet in size. After the raisins have been dried for 10 or more days the trays are rolled into bundles by folding the long edges of the paper toward the middle and then rolling the tray the long way to form a "biscuit roll." The rolls remain in the partial shade of the vines while further drying takes place. There are from 6½ to 7½ pounds of raisins on each tray. Both methyl bromide (2 cc. per tray) and granular paradichlorobenzene (10 g. per tray) greatly reduced the population in Zante raisins ("currants"). The reduction was apparently aided by 3 days of partial exposure to the heat of the sun. More successful were applications of about 2 cc. per tray of dichlorethyl ether absorbed in white cornmeal, applied to Thompson Seedless raisins. Treated and control rolls were left in the vineyard for 7 days. Samples taken at the end of the test indicated that living infestation in the treated rolls was zero, whereas the untreated controls averaged 72,000 per ton.

MEXICAN FRUITFLY CONTROL

Only one larval infestation found.--One larval infestation was found in the Edinburg district on November 14. In this infestation 11 fruits were found on or under 7 trees. Larval infestations in the fall of the year are somewhat rare, although in a few other seasons infested fruit has been found. As very few fruitflies have been trapped this fall, and as none of the previous fall infestations have ever been widespread, it is not believed that this one instance presages a general heavy infestation for this season. Fruit shipments for November totaled 4,325.7 equivalent carlots. The total shipment for the season, as of November 30, amounted to 7,692.2 cars. This amount is 774.7 equivalent carlots more than was shipped at the same date last season. Cold weather in the lower Rio Grande Valley, as well as in the winter-garden area, aided the maturity of citrus fruit but was damaging to tender vegetables. The Weather Bureau thermometer at Brownsville recorded a low of 38°, but unofficial thermometers at Edinburg and other places in the western end of the valley recorded 28° for short periods of time on November 15. Rainfall for the month amounted to 2.34 inches. Although the rains were general and precipitation was recorded on 13 days, there was not sufficient rainfall in parts of the area for the growers to dispense entirely with irrigation.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Mormon cricket in Big Horn Mountains requires 2 years for development.--J. R. Parker, Bozeman, Mont., states that reports had reached the Bozeman laboratory since 1935 to the effect that Mormon crickets in the Big Horn Mountains of Wyoming exhibited a biennial life cycle and consequently became abundant only every other year. F. T. Cowan, upon investigation, found that in collections of eggs from this locality, made in the fall of 1939 and at intervals during the following summer, the contained embryos required more than 1 year to attain maturity. The experimental evidence at hand failed to indicate that temperature alone was responsible for this retardation of development.

Carbon disulfide an effective soil fumigant for white-fringed beetle.--H. C. Young, Florala, Ala., reports that tests conducted during April and May 1940, in the Florala area, of carbon disulfide as a soil fumigant for the white-fringed beetle, gave an effective kill of the insect. This fumigant applied at a dosage of 6¼ pounds to 100 square feet of surface produced a drastic reduction in population but failed to effect complete mortality. The injection of the entire dosage at a depth of 2 inches was as effective as when half the dose was injected at 2 inches and the remainder at a depth of 8 inches. No apparent advantage resulted when areas that had been treated were covered with tarred building paper after fumigation occurred.

Newly hatched larvae of white-fringed beetle descend rapidly in soil.--Mr. Young also states that recent studies have shown that the newly hatched larvae of the white-fringed beetle descend in the soil at a rapid rate. On the sixth day after hatching they were found at a depth of 3 inches; at 21 days they had reached a 9-inch depth, and by 37 days they were 11 inches deep in the soil. The mortality of newly hatched larvae is great and reached 50 percent during the first week after hatching.

Effect of low moisture content in grain on certain insect species.--According to R. T. Cotton, Manhattan, Kans., experiments to determine the effect of low moisture content in stored wheat and corn on various species of insects contained in it showed that, although some species succumbed rather promptly, others survived for long periods under such conditions. The rice weevil, the flat grain beetle, and the lesser grain borer failed to reproduce in grain having a moisture content of from 7 to 8 percent and died in a short time. On the other hand, the black carpet beetle and the confused flour beetle lived for long periods in such grain, but were unable to breed freely in it.

Lygus bugs in alfalfa yield to community control action in Arizona.--V. L. Wildermuth and L. L. Stitt, Tempe, Ariz., report that serious reduction in yields of alfalfa seed, caused by feeding of Lygus bugs, in the Mohawk and Antelope Valleys of southwestern Arizona, led in 1939 to the adoption of a community control program which has proved highly successful. This was arranged through the cooperation of the local alfalfa-seed growers, the Bureau of Entomology and Plant Quarantine, and the Extension Service of the Arizona State Experiment Station. In accordance with an outline prepared by Messrs. Wildermuth and Stitt and C. E. Blackledge, county agent of Yu County, the growers agreed to adopt uniform cultural action throughout the year, aimed at greatly reducing the numbers of *Lygus* bugs early in the season, and later exposing them to maximum solar heat and starvation during harvest of the hay crop preceding the seed crop. This program consisted in a combination of clean-culture, pasturing, and irrigation schedules, together with uniform harvesting schedules so timed as to expose the bugs to maximum summer temperatures. In a seed-producing area of 4,600 acres the growers cooperated practically 100 percent in adopting this outline during the seasons of 1939 and 1940, with the result that bug populations were greatly reduced and alfalfa-seed production rose from an average of 174 pounds per acre in 1938, to 314 pounds in 1940. Some fields, having unusually excellent stands, produced from 400 to 600 pounds per acre. A check on these results was afforded by the *Lygus* infested but untreated south Gila seed-growing area, located some 29 miles distant. This produced in 1940 only 171 pounds of seed per acre and had a bug population per acre about five times as great as that present in the Mohawk area.

Many species of Phyllophaga captured in Japanese beetle traps.--Philip Luginbill, Lafayette, Ind., states that through the cooperation of E. G. Brewer, of the Japanese beetle control project, the trapped specimens of Coleoptera other than Japanese beetle were sent to Lafayette for study. A total of 7,103 specimens of *Phyllophaga*, taken from 75 points located in 28 States, were received in 1940. These comprised 58 species and 3 varieties, which was 13 species and 2 varieties more than were received in 1939. The collections in 1940 came from 10 more States than in the previous year. Through this excellent cooperation many valuable specimens and distribution records have been accumulated for inclusion in a publication on the taxonomy of *Phyllophaga*, which is in preparation. In addition to *Phyllophaga*, representatives of 23 other genera of the Scarabaeidae were included in this material.

First rearing of a little-known blind beetle.--August Balzer, Beaumont, Tex., reports the successful rearing of a little-known, blind and wingless beetle, *Thaumophrastus karanisensis* Blaisdell, from egg to pupal stage. This was accomplished by placing the eggs in petri dishes on mixtures of corn, wheat, and rice flour. This insect was originally described from material collected in an Egyptian tomb and its habits were previously unknown.

Dusting with rotenone for control of vetch bruchid.--According to J. S. Pinckney, Carlisle, Pa., dusting experiments with rotenone of 0.88 percent strength at the rate of 20 pounds per acre, for control of vetch bruchid, shortly after oviposition began in June and July 1940, at Arendtsville, Pa., gave encouraging results. In the plats receiving one application 82.6-percent mortality resulted. Those that received six applications showed 89.4-percent mortality. This work was done under rather unfavorable conditions, rain having retarded the applications this year until after oviposition had begun.

Cadelle in stored rice resists fumigation.--August Balzer, Beaumont, Tex., reports that in the fumigation of a rice mill and warehouse, containing 693,500 cubic feet of space, and a load of 5,500,000 pounds of clean, brewer's rice in 100-pound sacks, 525 pounds of liquid HCN was applied. This application resulted in 100-percent mortality of rice weevil adults, and 100 percent of their immature forms, but of the cadelles only 84 percent succumbed. The gas in this experiment was not artificially vaporized or circulated. In another experiment a concrete warehouse having a content of 894,200 cubic feet, and also a load of 3,939,000 pounds of clean rice , approximately nine-tenths of which was in burlap sacks and the remainder in cellophane-wrapped cartons in cases, was fumigated with methyl bromide. The dosage was 2 ounces of the fumigant to 1,000 pounds of rice, at 87° F. It resulted in killing 100 percent of the rice weevils and flour beetles in burlap bags but only 97 percent of the cadelles. An unsatisfactory kill of all insects was obtained in the rice packed in cartons.

JAPANESE BEETLE CONTROL

Perennials fumigated for Japanese beetle in Ohio and planted in Florida.--During November arrangements were made for the fumigation at one of the large Mentor, Ohio, nurseries of approximately 10,000 perennials of all varieties and the transportation of these fumigated plants to the Bureau's field laboratory at Sanford, Fla., for planting and observation as to the tolerance of the different species to methyl bromide fumigation. The Division of Control Investigations arranged for the land at Sanford, and assigned Randall Latta to cooperate with V. A. Johnson, of the Division's treating section, in conducting the tests. On November 18 about 490 varieties were fumigated, 6 plants of each variety. Because it was difficult to certify check plants for movement into Florida, it was decided to fumigate all 6 and have a larger number fumigated to compensate for the lack of check plants. The plants were packed for shipment on the 19th, left Mentor on the 20th, and arrived at Sanford on the 23d. Mr. Latta had the land prepared for planting and the plants were set in on the 25th and 26th. There was some leaf drop from foliated plants, owing to sweating in transit. This lot was fumigated at the 50° to 54° F. temperature range, 2½ pounds of methyl bromide per 1,000 cubic feet, with a 4½-hour exposure. A second lot of plants, consisting of about 430 varieties, was dug on November 27 and brought into the boiler room for preheating. They were fumigated the following day and arrived in Sanford on December 3, where they were planted the next day. In general, this lot arrived in better condition than the first truckload. At the time of the arrival of the second load, the first lot was showing strong growth, from buds to leaves 3 or 4 inches long.

Nurseryman employs variety of chemical treatments for Japanese beetle control.--Numerous treatments with carbon disulfide emulsion and paradichlorobenzene and fumigations with methyl bromide were performed at a large Maryland nursery. At this establishment carbon disulfide and paradichlorobenzene treatments have proved more satisfactory than fumigation. Part of the treated nursery stock was used to fill present orders and the remainder was heeled in in a certified plot for filling future orders. This nursery has installed a new power pump and pressure hose for use in washing nursery stock and plants which must be shipped soil-free. This is a more satisfactory and efficient method than hand washing. A nursery on the Eastern Shore of Maryland reports that orders for fruit trees are being received faster than they can be filled. A washing room that was recently completed at this place has enabled them to wash several thousand fruit trees early in the morning and has speeded up inspection work. Owing to cold weather on the Eastern Shore it was almost impossible to dig any large orders before 10:30 in the morning. This short working day necessitated hiring of additional employees by some of the nurserymen.

Japanese beetle control activities by New Jersey growers.--During November the nursery and greenhouse business in New Jersey has been such that all inspectors have been kept busy. The greenhouse business has been good, with most of the classified establishments reporting more business than for the same period in 1939. In some cases shipments of certified stock indicated a 35-percent increase in trade. The nursery business, on the other hand, has been rather slow. A few small orders have been handled but spring orders have received more attention. Stock has been cleaned and stored for early spring shipping. A cold snap during the month stopped all digging. Azaleas continued to hold a very important place for holiday stock. One South Jersey establishment leased a range of greenhouses near Bridgeton, where they are growing thousands of azaleas.

Japanese beetle control programs at isolated infestations.--Soil treatment with lead arsenate for Japanese beetle control was carried on in 20 cities in 7 States during November, with a total of 324.4 acres covered. Treating in Chicago was concluded on November 5, a total of 107 acres having been treated since work began in that city on August 29. Work in Indianapolis, Ind., where 43.2 acres have thus far been treated, will be resumed next spring. The soil-treatment programs in Logansport and Richmond, Ind., were finished in November. Treating activities were also completed in Detroit and Melvindale, Mich.; Newark, N. Y.; Durham, Elizabeth City, Goldsboro, High Point, Raleigh, Rocky Mount, and Salisbury, N. C.; Ashtabula, Belpre, Gallipolis, and Marietta, Ohio; and Danville, Va. There still remains additional acreage to be covered in Winston-Salem, N. C.

Hedgerow certified from World's Fair grounds.--Cold and rain hampered the treatment with carbon disulfide emulsion of 250 Taxus that formed a hedge at the former Glass Center, on the New York World's Fair grounds. Two weeks were required for application of the emulsion to the entire lot. The work was finally completed and 3 large trailer trucks transported the certified stock to a nonquarantined State.

Nursery and greenhouse inspection activities.--In the Baltimore, Md., area only 1 greenhouse will handle certified Christmas stock. This firm will benefit by higher prices for this certified material, since other classified establishments must confine their purchases of stock to be taken into their houses to certified material. Inspection of chrysanthemum and gladiolus shipments, in accordance with State European corn borer quarantines, was continued at the Baltimore wholesale houses. Some shipments had as many as 60 dozen blooms each. A large hydrangea grower in the Maryland district required the services of an inspector throughout most of the month. Over 12,500 hydrangeas in 4-inch to 8-inch pots were fumigated with methyl bromide, 2 carloads of which were shipped to Canada and 1 to Chicago. Two greenhousemen in the Baltimore area completed new concrete soil-treatment bins, and another expects to start a methyl bromide fumigation chamber in December. In the Norfolk, Va., area inspection and certification of nursery and greenhouse stock increased greatly during November. Two treatments of camellias were made with paradichlorobenzene.

Evergreen inspection for gypsy moth.--Owing to the finding of a large number of gypsy moth egg clusters on spruce-bough lots in the lightly infested area of western Massachusetts and southern Vermont, it was necessary to make actual piece-by-piece inspection of more than 160 tons of boughs. These were shipped under certification in 100-pound bales. Their principal use is for covering cemetery lots and perennial beds or for decorative purposes. No infestation was found in any of the boughs examined. Many New England nurseries are now manufacturing wreaths, sprays, and centerpieces from nursery-grown trees that are not fit for sale. In this way they are able to realize some money from their oversized stock. One nursery in central Connecticut is cutting and selling thousands of nursery-grown spruce as Christmas trees. This serves to thin out their plots to allow for increased growth of the remaining trees. Christmas tree operators report a scarcity of good, salable spruce or balsam trees in the lightly infested gypsy moth areas of Maine, New Hampshire, and Vermont. Of the two types, balsam is preferred because it does not shed the spills when placed in heated rooms.

Additional inspectors added to gypsy moth force.--Twenty-nine temporary inspectors were employed in the New England States during November to assist with the seasonal rush in connection with the inspection and certification of evergreen products. For the inspection of Christmas trees and greenery, 8 inspectors were employed in Maine, 1 in New Hampshire, 12 in Vermont, and 2 in Massachusetts. Two inspectors were added in Connecticut for the inspection of nursery stock and nursery-grown Christmas trees. To take care of inspection of lumber in carload lots, 1 inspector was added in Maine, 1 in Vermont, and 2 in New Hampshire.

Accomplishments in gypsy moth inspection.--From 45 infested shipments submitted for gypsy moth inspection and certification, 286 egg clusters were removed. In addition, 353 egg masses were removed from material inspected prior to its manufacture and shipment to various points outside the infested areas.

State Highway departments cooperate in eradication of Dutch elm disease.--A recent communication from the State Highway Commissioner of Connecticut outlined the precautions that Department is taking to cooperate in Dutch elm disease eradication work. "All of my specifications for road construction," the letter states, "are now carrying in their 'Special Provisions' the following note: "'All elm wood to be cut as a result of the contractor's operations will be confiscated by the United States Department of Agriculture or burned by the contractor at the direction of said Department. The contractor is warned that no portion of any elm tree shall be sold or removed from the premises.'" Arrangements have also been made with the State Highway Commissioner of New Jersey for similar disposal of elm wood cut as a result of contractor's operations in the State.

Additional Dutch elm disease infections in isolated areas.--Four diseased elms were discovered in the detached areas in November--one each in Kirkwood Township, Broome County, N. Y., and in the towns of Canaan, Dover, and Lodi, Athens County, Ohio. Since the discovery of first-record cases in Canaan and Dover on August 7 and 13, 1940, respectively, a total of three infected trees has been found in each locality.

Observations by scouts surveying for beetle-infested elms.--A large amount of beetle material was picked up during the course of scouting in the West Virginia area during November. Treetops and small broken trees left by timber cutters comprise a large portion of the material. Most of these trees were cut during August and September and are now suitable for beetle entrance. A few of the trees observed were infested with larvae of Scolytus multistriatus Marsh. An unusual case of Magdalis infestation was found in the Preston, New London County, Conn., area. A 5-inch hanger was so heavily infested that the larvae were only about 1/8 inch apart. A 3-inch hanger that had dropped to the ground was equally as bad. Woodpeckers had worked the entire length of the 5-inch limb that was still attached to the tree but had not attacked the limb on the ground. Both of these breaks were caused by the hurricane in September 1938. In Maryland, scouting for beetle material was mainly confined to the Town Creek Valley. This is a new area for systematic scouting and a large quantity of beetle material was tagged. The heaviest bark-beetle infestation in the Maryland work area exists in this section, and it is believed that the unexpected amount of S. multistriatus collected in the northeastern section of the regular Maryland work area was due to beetles being "fed" from this vicinity.

Workers trained to recognize bark-beetle infested material.--Training of scout and sanitation crews in the identification of elm wood infested with bark beetles, or wood likely to furnish breeding places for vectors of the Dutch elm disease fungus, was started late in November and will be continued throughout December. Last year a uniform training program was developed for the entire project, involving principally removal crews. This year each State supervisor has developed his own program. In this way, scout crews that are still in the field tagging beetle-infested or potential beetle material can be trained, as well as crews that will remove the tagged material. Reports from the several States indicate that without exception the W. P. A. foremen and scouts are keenly interested in such studies and are unusually anxious to learn more about their work. The quality of scouting for beetle material has improved considerably as a result. During the course of these studies in New Jersey it was found that a large percentage of the material previously regarded as potential beetle wood in slippery elm was actually beyond the stage suitable for beetle attack. This condition seemed to indicate that the bark of slippery elm rots much faster than does that of the American elm. Much of the material tagged in the course of the special beetle material study in New York was slash and woodpiles; however, a few interesting trees were noted. One such tree was 100-percent dead and was infested throughout. The larvae in the tree appeared to have been heavily parasitized, with a mortality of over 50 percent of the fully grown larvae. Several of the larvae in the top of the tree showed bubble-like protuberances.

FOREST INSECT INVESTIGATIONS

Parasite of European spruce sawfly utilized against native sawfly.--W. F. Sellers, New Haven, Conn., reports that early in November this Division supplied from 300,000 to 400,000 of the chalcid parasite Microplectron fuscipennis Zett. for release in pine plantations that have been severely infested by the native LeConte's pine sawfly in the vicinity of Wilson Dam, Ala. The parasites were released at 30 colony sites by G. M. Bentley, State entomologist of Tennessee, and Karl Schuster, of the Forestry Relations Department, Tennessee Valley Authority. This parasite has become successfully established in the Northeastern States on the European spruce sawfly and is fairly abundant in certain areas. It apparently will attack practically all species of Diprion and Neodiprion sawflies. LeConte's sawfly cocoons are readily attacked under laboratory conditions and the adults produced are larger than average size.

Time of year when elm hangers die governs bark beetle attack.--R. J. Kowal, Morristown, N. J., is making a study of insect attack on elm branches that are broken by wind, ice storms, and other causes. Often branches are almost completely severed at their bases, but remain in the trees and later die. They are commonly referred to as "hangers." Early in March 1940 a severe ice storm created an immense amount of such material in elm and other trees in portions of the major area affected by the Dutch elm disease. Mr. Kowal has kept some of these elm hangers under observation and has periodically created others by partially cutting through the bases of branches with a saw. He has found that those hangers created by the March storm and which died rapidly, and those hangers artificially created in June, have since been only lightly attacked by the elm bark beetles Scolytus multistriatus Marsh. and Hylurgopinus rufipes Eich. The March hangers that died in midsummer and those which were created in midsummer and died soon after were more heavily attacked. Considering all hangers, more galleries of S. multistriatus than of H. rufipes occurred. The H. rufipes galleries were made mostly in the material of larger diameter.

S. multistriatus attack heavy in wind-broken branches.--W. C. Baker, Morristown, N. J., reports concerning an experiment begun in 1938 in eastern Pennsylvania areas, in cooperation with the Bureau's Dutch elm disease eradication unit. During the winter of 1938-39 the project involved the destruction by burning of trees known to be infected with the Dutch elm disease fungus (Ceratostomella ulmi), the destruction of dead and dying elms, and the cutting off and destruction of all dead and dying limbs of the other elm trees within a mile of known infected trees. The purpose was (1) to remove known infected trees, (2) to remove latent infections that might be present in dead and dying trees or branches, and (3) to eliminate elm material in which the bark beetles Scolytus multistriatus and Hylurgopinus rufipes, which carry the fungus, might be present or which was suitable for attack by them. During August 1939 and August 1940 the pruned trees were examined for die-back and wind-breaks and the dead and broken branches were indicated on sketches that had previously been drawn of the trees. In October 1940 all dead branches having an estimated basal diameter of 1-1/4 inches or greater were removed and examined. Smaller material was disregarded because of its lack of importance as a breeding ground for the bark beetles. After being removed the branches were stripped of their bark, measured into 2-foot sections, the circumference of each section taken, and a record made of the various insect galleries found. Eighty-five percent of the total number of sections examined were in the diameter classes of 2 inches and less, while 69 percent were in the 1-inch and 1-1/2-inch diameter classes. There was a total of 343 square feet of bark on the sections. Only 10 H. rufipes galleries were noted. These were all in a $3\frac{1}{2}$-inch diameter section. The number of S. multistriatus, Magdalis, cerambycid, and buprestid galleries per square foot of bark area averaged 1.28, 0.30, 0.30, and 0.12, respectively. In the case of H. rufipes and S. multistriatus the term "gallery" as used here included the egg gallery and the larval tunnels radiating from it, while of the other insects it refers to the tunnel made by one larva only. When the number of S. multistriatus galleries in sections from branches that had been broken by the wind or by other causes was compared with the number in sections from "natural die-back" branches, it was found that the wind-broken branches were much preferred for oviposition by the beetles. In the wind-broken branches the average number of S. multistriatus galleries per square foot of bark was 14.88, whereas in the "natural die-back" branches it was only 0.27.

Concentrated sprays effective against Cylindrocopturus weevil.--C. B. Eaton, Berkeley, Calif., reports that concentrated sprays, which have proved to be effective against the white pine weevil in the Northeast, will protect young ponderosa and Jeffrey pine trees from attack by the weevil Cylindrocopturus sp. In experimental tests with potted seedlings at the Hat Creek laboratory, and with 5-and 6-year-old planted stock in the Big Springs brush field, Lassen National Forest, a lead arsenate spray effectively prevented damage to trees exposed to attack by the weevil. The spray consisted, by weight, of 1 part acid lead arsenate, 0.25 part summer Vaporol, 0.03 part Vatsol OS, and 10 parts water. It was applied at the rate of approximately 1/10 pint per tree, using a paint spray gun operated in connection with a wheelbarrow-type power compressor. Unsprayed check trees succumbed to the injuries caused by the weevil in nearly every case. No deleterious effects attributable to the chemical were evident on the treated trees 5 months after the spray was applied. Large-scale tests are necessary before accurate costs for this method of control can be determined.

Field work on forest insect hazard inventory completed.--P. C. Johnson, Berkeley, reports that with the completion in September 1940 of field work on the Tahoe National Forest, the Berkeley forest-insect laboratory is rapidly bringing to a close one of the largest and most comprehensive survey studies ever undertaken in California. The forest insect hazard inventory was begun in 1937 as an initial measure in a new and determined effort to subdue the pine-beetle infestations in the ponderosa-Jeffrey pine region of northeastern California. This region furnishes annually about 630 million board feet of pine lumber and is the chief source of box shook for the many thousands of fruit growers in the State. In addition, the forest drain from insects in northeastern California has averaged nearly half this amount during the last few years, or over 300 million board feet annually. This has not only been a tremendous loss to the lumber industry, but threatens to become a continuing source of forest depletion and monetary loss unless some drastic measures are soon taken. Direct-control measures in the east-side pine stands of northeastern California have not been successful in stemming the beetle infestations and recently the western forest-insect laboratories have advocated measures to salvage the timber values before they are destroyed and to further reduce the beetle populations by removing the favored host, i. e., those trees which, by reason of their low vigor condition, are most likely to be attacked by the beetles. These susceptible, or high-risk trees, can now be recognized with a marked degree of certainty by symptoms which even the layman soon recognizes. The hazard inventory has made available the information most needed by both private and Federal timber agencies interested in this logging method of insect control. Some 2½ million acres of pine timber have been covered by a 0.6-percent volume cruise which necessitated running approximately 1,900 miles of strip through the forests. Compilation work which will soon be completed will show for this entire area (1) maps of the distribution of the area according to insect hazard, and (2) complete statistics, by small units, of timber resources by species, cumulative insect loss for the last 15 years, and the proportion of the existing pine stand now made up of high-risk trees. This material is being received with interest by the pine industry and has already been the basis of several logging studies to test the effectiveness and practicability of this method of control. The Forest Service has also incorporated hazard inventory results on some areas into new forest-management plans now being completed.

Beetle epidemic in San Bernardino Mountains has been checked.--S. T. Carlson, Berkeley, has recently completed the fall survey of the San Bernardino National Forest and reports that the control work carried on last winter and spring has successfully checked an aggressive bark-beetle epidemic. The control area included 12,000 acres of intensively used recreational forest lands in the Lake Arrowhead and Crestline districts in San Bernardino County. During the summer of 1939, the pine cover on some 30,000 individual summer-home lots was threatened by a grouping infestation of Ips and western pine beetle (Dendroctonus brevicomis Lec.). The private owners financed control work through an assessment by the Zone 5 Flood Control District of San Bernardino County, which is authorized to conduct various projects involving watershed protection. Work on the National Forest lands was carried out by the C. C. C. organization. During the 1939 season bark beetles killed a total of 1,250 trees, of which 800 were treated during the winter control campaign. For the season of 1940, the total loss is estimated at less than 50 trees, and only a small amount of maintenance work will be necessary for the coming winter.

Abnormal season complicates beetle control.--Western pine beetle control projects now being conducted by the Fremont National Forest and Klamath Forest Protective Association are experiencing some difficulty in locating the proper trees for treatment because of the unusually wide range in foliage fade on trees containing overwintering broods. According to W. D. Bedard, of the Portland, Oreg., laboratory, broods can be found in trees with tops ranging from green to sorrel, while some slightly faded trees have been abandoned at the base but contain abundant broods above. These peculiar foliage conditions resulted from an unusually early spring in the Klamath Basin, which caused an abnormally early attack by the beetle and permitted three broods to develop during the 1940 season, instead of the usual two broods for this region. The danger of missing green-topped trees under these unusual conditions has necessitated slowing the rate of spotting in order to make a more thorough examination of the area. It was also found

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necessary to mark many doubtful trees so that they could be felled and examined by the treating crews to ascertain whether beetle broods are present in the top.

First bark-beetle control project on Malheur National Forest.--The Bear Valley control project against the western pine beetle in ponderosa pine stands of the Malheur National Forest, in eastern Oregon, got under way on November 5. This is the first pine-beetle control project to be attempted on this forest, according to W. J. Buckhorn, of the Portland forest-insect laboratory, who handled the training of spotting and treating crews for this work. The area of infestation covers approximately 56 sections, consisting of equal portions of virgin stands and cut-over stands from which approximately 40 percent of the volume was removed by selective logging. The infestation ranges from 40 to 90 trees per section, which is considered as a moderate epidemic. Treating of the infested trees will be carried on jointly by the Forest Service and the Edward Hines Lumber Company of Burns, Oreg. All infested trees accessible to logging are to be salvaged by the company. Inaccessible trees are being treated by C. C. C. labor using the fell-peel-burn method of control.

Western pine beetle found in Douglas fir region.--An infestation of bark beetles in a native grove of ponderosa pines along gravel flats of the Willamette River near Corvallis, Oreg., was called to the attention of F. P. Keen, of the Portland forest-insect laboratory by W. F. McCulloch, assistant professor of forestry at Oregon State College. On visiting the area, infested bark containing western pine beetles and the usual assortment of associated species was collected. Many pines had been killed and some younger trees had been killed by Ips confusus Lec. It is of interest to find these insects following their host tree, even though isolated by 70 miles of Douglas fir forests from their typical habitat in ponderosa pine forests east of the Cascade Mountain Range.

Elm leaf beetle parasites liberated in Portland.--The Park Bureau of the city of Portland, Oreg., has been interested in getting the help of beneficial insects in the control of the elm leaf beetle, against which the city wages an intensive spray program each year. Through the cooperation of Stanley E. Flanders, of the California Citrus Experiment Station's division of beneficial insect investigations, two species of elm leaf beetle parasites have now been introduced into Portland. The hymenopterous larval and pupal parasite, Tetrastichus brevistigma Gahan, was first received at the Portland forest-insect laboratory and liberated on September 11, 1940. More recently a shipment of the tachinid parasite, Erynnia nitida R. D., was received as overwintering larvae within host adults. These will be liberated after colonization in the laboratory.

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Brush burned in unfavorable scouting weather.--Scouting conditions were generally unfavorable over the entire region where gypsy moth work is performed during much of November. However, the rain and snow removed the fire hazard from the forests, and large quantities of brush and debris, accumulated in the course of selective thinning and cleaning operations, were destroyed by burning.

Gypsy moth work modified during hunting seasons.--Early in November suitable locations were selected in Vermont, Massachusetts, and Pennsylvania where gypsy moth scouting work could be done during the hunting seasons without the danger of workers being struck by stray bullets. During these periods work will be done in village areas or in open country where the tree growth is sparse and scattered. The men will not be permitted to work in woodlands, except in areas reserved as game sanctuaries or on private properties which are adequately patrolled during the hunting seasons.

Varying degrees of infestation in Vermont.--The discovery of numerous scattered gypsy moth infestations continued in the townships of Castleton and Hubbardton, Rutland County, Vt. All of these infestations are small, most of them consisting of single egg clusters. Intensive scouting recently completed in the vicinity of the single-egg-cluster infestation found several weeks ago in the southern part of the township failed to disclose further evidence of the presence of the gypsy moth, although another single-egg-cluster infestation was found about 4½ miles away. Several days' close scouting of the vicinity of the latter infestation also produced negative results. Crews working in Eden, Lamoille County, progressed slowly while working under especially difficult conditions in the course of examining large bog and swamp areas where scrubby growths of spruce occur in almost impenetrable thickets. Only one single-egg-cluster infestation has been found in Eden during the present work. Late in November scouting work was started in the townships of Fair Haven, Pittsford, Poultney, and Sudbury, Rutland County, and in Shaftsbury, Bennington County. Two gypsy moth egg clusters were found in Pittsford Township, which was infested in 1927.

Numerous scattered infestations found in Chester.--Gypsy moth scouts working in the township of Chester, Hampden County, Mass., have found numerous scattered infestations, and much intensive scouting is needed in that area. The progress of the work was materially impeded because of the necessity of closely examining stone walls that extend long distances through the infested area. These walls furnish excellent concealment for gypsy moth egg clusters, and they cannot be readily inspected during the winter. Therefore as much of this work as possible was accomplished while the weather conditions were favorable.

Scouting of spruce wood lots completed.--The scouting of areas in the townships of Becket and Washington, Berkshire County, Mass., where spruce boughs are to be cut during the coming holiday season, was completed during the latter part of November. Eight wood lots, aggregating about 250 acres, were carefully scouted and resulted in the discovery of two gypsy moth egg clusters in one of the lots in Washington, and three egg clusters at one location and four at another in Becket. Spruce growth comprised 50 to 90 percent of the growth in these stands. Hundreds of tons of boughs are cut, baled, and shipped annually from Berkshire County towns to New York City and other large centers for use during the Christmas season.

Brush-disposal machine used in State Forest Reservation.--Rain and snow prevented substantial accomplishments by gypsy moth scouts in Massachusetts during the first 2 weeks in November. Light conditions were unsatisfactory for the examination of tree growth during much of the time when scouting work could be performed, except in isolated spots where the growth was low. However, the conditions were favorable for burning accumulated brush and debris, and progress was good in this type of work. The brush-disposal machine owned by this activitiy was used in a State Forest Reservation near Pittsfield, Berkshire County, where a small gypsy moth infestation was found early in the fall. Only light thinning work was necessary to free this comparatively dense stand of the dead and defective trees and other undesirable material, and to put it in satisfactory condition for future gypsy moth control work. Much of the brush which accumulated during this work could not be burned immediately because of the fire hazard. The brush-dispoal machine converted much of this brush to sawdust and small chips during the limited time when operations were possible during November.

Gypsy moth work at heavily infested site.--Intensive scouting has been completed in the center of the gypsy moth infestation in Southbury, New Haven County, Conn., where several thousand new egg clusters were found last year. No new egg clusters were found during the current examination, although about 30 old egg clusters were discovered in hidden locations. The absence of living infestation clearly indicates the effectiveness of the various types of treatment that have been applied since the gypsy moth was discovered in Southbury, and it now seems reasonable to expect that any living infestations that may exist in the area immediately surrounding this formerly heavily infested location will be exterminated during the present fiscal year.

Progress made in Connecticut despite difficult labor situation.--The unsettled weather prevalent during much of November interfered to some extent with gypsy moth scouting work in Connecticut, but provided excellent burning conditions. Large quantities of brush, waste wood, and other trash which had accumulated at various infested sites were burned. An increased demand for white or paper birchwood for fireplaces and novelties by New York City markets has added to the gypsy moth inspection work in Connecticut. Much of this wood is obtained in Litchfield County, and it must be carefully examined before shipment from the quarantined area. Most of the wood is shipped in 4-foot lengths. The problem of maintaining a full force of gypsy moth workers is becoming increasingly difficult, as production in industrial centers is speeded up to meet the demands of the National Defense program. It is especially difficult to obtain foremen, as men capable of directing crews are in demand in manufacturing plants at decidedly better wages than they could receive as W. P. A. workers. Several foremen resigned recently because they had obtained other employment, and workers in lower classifications are also resigning for the same reason.

Gypsy moth work in Pennsylvania.--Stormy weather and unsatisfactory light conditions interfered considerably with gypsy moth scouting work in Pennsylvania during much of November, but the elimination of the fire hazard by snow permitted the burning of large accumulations of brush and deadwood. The employment situation in this State improved somewhat late in the month, as the number of newly assigned workers slightly exceeded the number of resignations of W. P. A. workers. Although there has been no appreciable increase in business activity in the area where gypsy moth work is conducted, there has been a definite movement of workers to industrial centers in other parts of the State that have been more affected by the National Defense program and this has caused a heavy turn-over, which still continues, in gypsy moth personnel. Gypsy moth extermination work in Lackawanna and Luzerne Counties done by the N. Y. A. under the supervision of this Bureau increased greatly during November. Arrangements were recently made to increase the number of enrollees available for gypsy moth work, and the men were broken up into smaller, more efficient crews, many of which were directed by experienced W. P. A. foremen. While the amount of work accomplished by W. P. A. workers is less than was expected, owing to absences of workers, the men have given satisfactory service, and their employment has released more active and experienced men for work in outlying territory. The cutting and baling of evergreen boughs increased greatly in the gypsy moth quarantined area of Pennsylvania, particularly in the Pocono Mountain region where spruce is most abundant, and it was necessary to detail additional inspectors to examine the shipments so there would be no spread of the gypsy moth from that source.

C. C. C. Gypsy Moth Work During November

General.--During November 5,490 6-hour man-days were used on gypsy moth work by the C. C. C., as compared with 6,462 man-days used in October. Although the amount of work accomplished was less during November, the reduction was not as great as the figures would indicate, as work was performed during 5 weeks in October and during only 4 weeks in November. The actual reduction in work was caused by a lack of sufficient man power, owing to unfilled quotas at the camps, to 2 holidays during the month, and to rains and heavy snowfalls. The treatment consisted of selective thinning of favored food plants, burning accumulated brush and forest debris, and scouting, with more emphasis placed on scouting than was the case earlier in the season. Inspections of areas treated before the hurricane to reduce the amount of favored food plants of the gypsy moth have shown generally light and scattered infestations, and many cases were noted where the reproduction of more resistant species of trees in treated areas is resulting in notable improvement in the stands from the gypsy moth control point of view. Clear cutting has been done on some State properties where the State foresters plan to follow the work with the planting of trees unfavorable to gypsy moth development, and similar work has also been done on some private properties where the owners agreed to replant with gypsy moth resistant growth. Several cases were observed where the owners of private woodlands were following the methods of treatment used by the C. C. C.

Vermont.--Gypsy moth scouts continue to find severe infestations in the eastern part of Vermont. The cost of treatment work is running higher than normal in some areas that were badly damaged by the 1938 hurricane and where no clean-up work has been done. The debris is so thick and tangled that it is impossible to do selective thinning or cleaning work in some of these areas until the fallen trees have been removed.

Massachusetts.--Gypsy moth infestation in Massachusetts is scattered and without pockets of heavy concentration except in an area in Westhampton, Hampshire County, where the egg clusters are somewhat more abundant than in other sections that have been scouted this fall. The extent of this heavier infestation has not yet been determined, but rapid scouting showed approximately 300 egg clusters per acre. This is a much lighter infestation than was present in this area 2 or 3 years ago, but the infestation is heavier than those now present in the surrounding areas. Areas of heavier infestation, such as that in Westhampton, are marked for further treatment, particularly the reduction of favored gypsy moth food plants by selective thinning of the forest growth.

Connecticut.--Gypsy moth conditions in Connecticut are similar to those in Massachusetts, scattered infestations with no heavy concentrations of infestation. C. C. C. gypsy moth work in this State is closely coordinated with that of the State gypsy moth organization. The C. C. C. work is done in towns bordering the barrier zone, while the State work is done in areas that cannot be reached by the C. C. C. The cooperation between the two organizations permits the attainment of maximum benefits from the work of both, and is of great advantage to the gypsy moth project as a whole.

PLANT DISEASE CONTROL

Chemical tests on Ribes bushes.--H. E. Yost, in charge of blister rust control work in Maryland, reports that tests to determine the ability of different substances to kill the root systems of decapitated Ribes bushes were made in Garrett County, Md., in 1940 on the west slope of Meadow Mountain, at an elevation of approximately 2,800 feet, with northwest exposure and open hardwood type. The bushes were not measured but an attempt was made to select old plants, 5 or more years of age and from 2 to 3 feet in height. The bushes were cut off with a pocketknife at or just above the crown. Six chemicals were used--borax, sodium chlorate, diesel oil, salt, used crank-case oil, and ammonium thiocyanate. Two dosages of each chemical were applied to 11 bushes, and there were 11 checks in which no treatment was applied except decapitation. A total of 143 bushes were treated and staked on July 25, 1940. These bushes were checked on October 7. The results indicate that a mixture of 5 parts of borax to 1 part of sodium chlorate, as well as diesel oil and ammonium thiocyanate, killed the root systems, no regrowth having been observed in any bush so treated. Coarse salt, when applied at approximately 4.4 ounces per crown, resulted in no regrowth, but in 1 case when it was applied at 2.2 ounces per crown, about ¼ inch of sprout growth was observed. Where borax was applied at the rate of 1.3 ounces, 2 crowns sprouted a total of 3/4 inch of growth, and where borax was applied at 2.6 ounces per crown, 1 sprout produced approximately 3 inches of growth. Crank-case oil was applied at the rate of 2 ounces and 4 ounces and in each case all of the treated crowns sprouted. The higher dosage resulted in growth of approximately twice as much live stem as did the weaker dosage. The bushes receiving no treatment produced approximately half as much live stem as did those receiving crank-case oil. The tests indicate that ammonium thiocyanate, diesel oil, and the mixture of borax and sodium chlorate are equal in their killing power. Since the diesel oil is by far the cheapest of the 3 items, it apparently should be used. Coarse salt purchased in quantity would probably be cheaper than any of the above items and when applied in a larger dosage would probably be equally effective. All of the bushes in these tests were R. rotundifolium. In each case when a bush was decapitated the stems were left lying on the ground. On October 7, 1940, 116 of the original 143 tops were found. Of these, 16, or 13.8 percent, had layered and produced tip sprouts. A total of 36 sprouts were observed. This indicates the advisability of continuing the practice of hanging up bushes during eradication work.

Ribes eradication effectively controls blister rust.--Mr. McCasland, district blister rust leader in New York State, reports that in 1932 all valuable white pine areas in the town of Cairo, Greene County, N. Y., were initially protected from blister rust by the eradication of Ribes and this fall, after a lapse of 8 years, pine-infection studies were made to determine the effectiveness of the control work. Seven areas, as nearly representative of varying conditions in the county as it was possible to obtain, were selected and strip lines 1 rod wide and 1 chain apart were run through the areas. All white pines on these strips were examined and listed as healthy or diseased, and, if diseased, the year of infection was obtained by determining the age of the wood at the point where each canker occurred. The 7 areas totaled 7.2 acres. Of the 14,192 trees examined, 1,047, or 7.4 percent, were infected with blister rust. Of the 1,047 infected trees, only 67 became infected in 1932 or later, that is, following the initial eradication of Ribes on these areas, although no reeradication of sprouts and seedlings has yet been carried out.

Blister rust notes from Rhode Island.--A. C. White, blister rust agent in Rhode Island, writes that he visited a roofing company in Rhode Island which was using 10,000 cords of wood a year--white pine, pitch pine, and soft maple--for pulp. Of this wood 75 percent is white pine, which is preferred because it has a better and longer fiber. Hurricane timber is being used in manufacturing shingles and roofing paper. The latter is another use for white pine which may increase as time goes on, as it is now in its infancy. It is also helping greatly in the forest clean-up, especially for the small property owner. A total of 811,169 pines were planted this year in Rhode Island. A good share of these trees were planted on State property where Ribes-eradication work was carried on during the summer. Nearly 19,000 currant and gooseberry bushes were destroyed in the State during the last year to protect the white pine, which is the State's most valuable timber crop. These bushes were removed from 28,864 acres by 116 employees of the Soil Conservation Service, the Civilian Conservation Corps, and the Works Progress Administration. This work was especially timely as white pine is reproducing on many areas since the hurricane, and unless protected the young trees may succumb to blister rust infection.

Salt-spray damage in Massachusetts.--C. C. Perry, in charge of blister rust control work in Massachusetts, reports that he recently visited areas in the towns of Marion, Mattapoisett, and Wareham, where pines were injured by salt spray during the 1938 hurricane. Evidence of damage persists only in the white pines in the open or in individual pines whose crowns towered above the associated forest growth. Such trees still show the effect of defoliation by the salt spray and are now characterized by the persistence of large limbs devoid of foliage and with dense groupings of dead branchlets. In closely stocked stands and, in general, in younger age classes little or no effect is apparent now, approximately 2 years after the injury occurred. Where areas near the coast line were completely submerged in salt water, the trees were completely killed. This condition is different, however, from the salt-spray situation, where complete killing rarely occurred, and then only in cases where the trees had apparently been weakened by other causes, such as defoliation by the gypsy moth.

Rye straw used in manufacture of strawboard.--The control of black stem rust is of interest to companies engaged in the manufacture of strawboard.

According to a recent letter from L. W. Melander, one firm in St. Paul purchases annually about 15,000 tons of rye straw for this purpose. Only straw that is clean, crisp, and of good length can be used. Straw that has been damaged by stem rust is not suitable for this purpose.

Barberry bushes found along Rush River, N. Dak.--Five barberry bushes, *Berberis vulgaris*, three of which were bearing fruit, were found in September along the Rush River, in Cass County, about ¼ mile from a location where planted bushes were destroyed in 1923. Considering the location of these bushes with respect to important grain-growing areas in North Dakota, an intensive survey of all uncultivated lands for a distance of several miles in all directions should be made, to insure complete eradication of any wild bushes in this area. During the period January 1 to June 30, areas given an intensive survey in Ramsey, Benson, and Wells Counties totaled 1,800 square miles. More than 100 man-months of W. P. A. labor was used. No W. P. A. labor has been used in North Dakota since July 1.

Bureau-sponsored W. P. A. project in Michigan State program.--A recently approved Bureau-sponsored project in the State W. P. A. program in Michigan provides an average of 168 security-wage earners for a period of 12 months. On October 1, 1940, the first assignments were made under this project and survey was begun in Benzie, Grand Traverse, Kent, Leelanau, Manistee, and Mecosta Counties. By the first of December, 114 men were employed. These were divided into crews of 6 to 10 men each and field work is reported as progressing smoothly under the direction of supervisors Towner, Case, Nixon, Lindy, and Stoneman. Chester F. Salisbury, assistant State leader in Michigan, has been designated as general superintendent in charge of the State project. Crew organization and field procedure follows the same general outline as in the case of the F. A. project.

Destruction of 4,000 barberry bushes in Wisconsin since September 1.--The following table briefly summarizes control work accomplished in Wisconsin during the period September 1 to November 30, and includes a report of the men employed as of December 1.

County	Area covered	Properties cleared		Bushes destroyed	Men employed December 1	
		New	Old		F. A. project	State project
	Square miles	Number	Number	Number	Number	Number
Buffalo-------	7	4	0	65	17	--
Columbia------	3	5	9	117	(1)	(1)
Crawford------	22	3	0	6	--	5
Dane----------	31	11	33	1,238	(1)	(1)
Dodge---------	105	7	9	74	(2)	(2)
Dunn----------	57	19	2	1,697	7	--
Eau Claire----	44	4	2	75	7	--
Fond du Lac---	2	4	4	37	(2)	(2)
Green Lake----	1	0	0	0	--	11
La Crosse-----	7	24	2	549	(1)	(1)
Portage-------	4	2	4	29	--	20
Sheboygan-----	56	31	26	175	--	21
Winnebago-----	104	21	17	272	(2)	(2)
Manitowoc-----	0	0	0	0	--	15
Total------	443	135	108	4,334	31	72

1/ Work suspended.

2/ Work completed.

According to Tom Van Zanden, leader in charge, State project crews are now operating in Crawford, Green Lake, Manitowoc, Portage, and Sheboygan Counties. It is expected that F. A. crews now under assignment will complete work remaining to be done in Eau Claire and Dunn Counties shortly after January 1. F. A. funds remaining for expenditure during this fiscal year will be used in Buffalo County.

Correction.--In the November 1, 1940, issue of the News Letter (v. VII, No. 11, pp. 17-18) a brief summary of a report by R. U. Cotter, of the Federal rust laboratory, St. Paul, Minn., concerning the results of rust identifications was incorrectly quoted as stating that Race 17 of *Puccinia graminis tritici* is one of the few races which has, under certain conditions, caused some infection on Thatcher wheat. Race 17 has been comparatively rare until recent years and its potentialities are not fully known. It attacks most of the durum and common wheats severely, with the exception of varieties derived from Kanred, among which is Thatcher.

COTTON INSECT INVESTIGATIONS

Pink bollworm parasite releases.--L. W. Noble, of the Presidio, Tex., laboratory, reports that during the quarter July 1 to September 30, 1940, 90,500 *Chelonus blackburni* Cameron, bred on the Mediterranean flour mot (*Ephestia kuehniella* Zell.), were released in the Presidio Valley and 30,000 in the lower Rio Grande Valley near Brownsville. Pink bollworm host larvae, which are necessary for rearing the other species of parasites on hand, were not available until the latter part of September. One shipment of 1,974 *Microbracon kirkpatricki* Wilk. was sent to Brownsville on September 23 and was released in nearby Mexico. One colony consisting of 2,000 adults of *Microbracon nigrorufum* Cush. was released in the Presidio Valley on September 19. These were from material stored since last fall. The survival in the stored material was about 43 percent. The remainder of the stored material was used for breeding in the laboratory. Three shipments of *Chelonus pectinophorae* Cush. were received from Japan through cooperation with the Division of Foreign Parasite Introduction. Twenty-two adults arrived alive in the first shipment on August 3, 48 in the second on August 31, and 17 in the third on September 10. Oviposition from these was obtained in eggs of the pink bollworm and the Mediterranean flour moth, with successful development in both hosts.

Bollworm control in field-plot tests.--According to K. P. Ewing and R. W. Moreland, 136 small plots (1/18 acre in size) were utilized at Waco, Tex., during 1940 in testing various insecticides against the bollworm. There were 4 randomized-block experiments, 2 of 8 and 2 of 9 treatments, each treatment replicated 4 times in each experiment, started during the latter part of July. The treated plots in all 4 tests received 3 applications of insecticide but 2 of the experiments were discontinued on August 1, owing to lack of an injurious infestation. The remaining 2 experiments, which were duplicates of those discarded, were carried through to completion. In the experiment where all the treatments were dusts, lead arsenate, cryolites containing 94.6 percent and 87.9 percent sodium fluoaluminate, respectively, and basic copper arsenate, in the order named, gave the best results with gains over the checks of 208.8, 179.4, 163.1, and 155.0 pounds per acre, respectively. These are fair gains for 3 applications, considering that most of the worms were over half grown when dusting operations were begun and that the first application was made under conditions very unfavorable for dusting. Gains from the other treatments were 144.4 pounds from calcium arsenate, 123.6 pounds from cryolite containing 66 percent Na_3AlF_6, and 50.6 pounds from cryolite containing 50 percent Na_3AlF_6. The bollworm injury and increase in yields were in direct proportion to the amount of sodium fluoaluminate in the cryolites with the higher percentages, but the cryolite containing only 50 percent Na_3AlF_6 gave very poor control. In the other completed bollworm experiment 4 sprays and 4 dusts were applied at approximately the same number of pounds per acre. The lead arsenate spray gave a slightly higher gain than any of the other treatments. The gains from the treatments were: 125 pounds from lead arsenate spray; 110 pounds from lead arsenate dust; 121.9 pounds from calcium arsenate dust; 61.2 pounds from calcium arsenate spray; 49.4 pounds from regular barium fluosilicate dust; 53.9 pounds from micronized barium fluosilicate dust; 27.5 pounds from micronized barium fluosilicate spray; and 17.4 pounds from cryolite spray (87.9 percent Na_3AlF_6). Calcium arsenate, lead arsenate, and micronized barium fluosilicate, applied as both dusts and sprays, produced an average gain of 95.2 pounds when applied as dusts and 71.2 pounds of seed cotton per acre when applied as sprays.

Insecticide tests for pink bollworm control.--Investigations on insecticidal control of the pink bollworm were continued this season at the Presidio, Tex., laboratory, by W. L. Lowry. Conditions were unfavorable for the tests because of the light and uneven pink bollworm infestations and the presence of bollworms, leaf worms, stink bugs, and Texas root rot in the cotton used for the tests. In view of the fact that previous investigations had shown that arsenicals were not very effective against the pink bollworm more attention was given to fluorine insecticides and various ovicides. The results in the plot and cage tests with insecticides were based on the percentage of reduction in larvae per boll. In the laboratory tests with ovicides, the results were based on the percentage of reduction in the number of hatchable eggs. In a Latin square with 1/16-acre plots, comparing cryolite dusts composed of different particle sizes but approximately the same (85-93 %) sodium fluoaluminate content, micronized cryolite (Kryocide) caused a reduction of 55.5 percent in number of larvae per boll over the check, as compared with 46.7 percent for the regular particle size (Alorco) and 25 percent for coarse particles (Alorco Precipitate 562). The coarse-particle material was distinctly inferior to the others in dusting qualities and frequently clogged the hand dust guns. In three other field tests Alorco cryolite dust containing 33 percent Na_3AlF_6 caused 19.7 percent, 24.6 percent, and 44.8-percent reductions in number of larvae per boll. In a small series of cage tests where the cotton plants were first treated and pink bollworm moths were then released, barium fluosilicate applied as a dust caused 81.4-percent reduction in larvae per boll, as compared with 86.4 percent when applied as a concentrated spray containing an adhesive oil and a wetting agent. In a randomized-block experiment (three replications) where six applications of insecticides were made at 5-day intervals, basic copper arsenate dust caused 28-percent reduction, cuprous cyanide dust 43 percent, cryolite dust (approximately 85 percent Na_3AlF_6) 53 percent, and cryolite-oil spray (50 lb. to 50 gal. summer oil, and 50 gal. water), 59 percent reduction. Nicotine sulfate and light petroleum oils, alone and combined in various proportions with and without emulsifiers, were tested in the laboratory against several thousand eggs of the pink bollworm. In part of the tests the bracts were removed from the bolls and the calyx turned back to expose the eggs, in others the eggs were either removed to blotting paper or were allowed to remain undisturbed on the boll. Either the ovicide was applied as a spray or the bolls were dipped in the solution. Both the nicotine sulfate and the oils reduced somewhat the percentage of eggs hatching but in all cases were more effective when combined. In general the older eggs were more susceptible to the ovicides than the freshly laid eggs, especially in cases where nicotine sulfate was used. The percentages of reduction in hatch due to treatments, as calculated by Abbott's formula, ranged from 7.8 to 97.3 percent. The most effective treatment was a spray composed of two parts of 40-percent nicotine sulfate to 50 gallons of miscible oil (Vaporol) and 50 gallons of water. The results were encouraging in that a high percentage of egg mortality was obtained; however, it should be borne in mind that under ordinary field conditions incomplete coverage and other factors would doubtless influence the efficiency of the treatment.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Inspection.--It is necessary to make annual inspections of gin trash in all cotton-growing areas of the United States each season in order to have definite knowledge relative to the status of pink bollworm infestation. Some gin-trash inspection is also conducted at opportune seasons in the various Mexican areas, as a result of the control program for the suppression of the pink bollworm carried out cooperatively by this Bureau and the Mexican Department of Agriculture. Gin-trash inspection was continued in the Panhandle district throughout November, with from 9 to 11 units in operation. No worms were found in that district during the month and, except for the extremely light infestation found in Tom Green, Midland, Martin, and Howard Counties in October, inspections in all of that area were negative for the season, and no infestation was found in outside areas. Gin-trash inspection which was begun in the Salt River Valley of Arizona in October, was continued throughout November. In addition to the light pink bollworm infestation found in the Glendale area of the Salt River Valley in October, a few more specimens were found in the same field around the middle of November, and 122 additional pink bollworms were taken from this field on November 29. Results of inspection were negative in all other parts of the Salt River Valley. Inspection was also carried on in Pinal County, a considerable amount of trash being inspected in the Coolidge-Casa Grande area. One specimen was taken from a gin at Coolidge, the only specimen found in Pinal County. Examination of all trash from the gins at Marana and Sahuarita, in Pima County, where an extremely light infestation was found last season, gave negative results. A number of cottonfields in the vicinity of Vado de Cedillos, in the Juarez Valley of Mexico, across the Rio Grande from the El Paso Valley district, were found to be heavily infested with the pink bollworm during October and November. Infestation has been present in this vicinity for a number of years, but appears to have increased in intensity during the present season. Plans are being made to cooperate with the Mexican inspector in charge of that area in cleaning a limited cotton acreage in the vicinity of Vado de Cedillas in an effort to suppress the infestation. A light infestation of the pink bollworm was also found during the period in trash originating at La Ascencion. This is the first trash to be inspected from this new area planted to cotton in the northwestern part of the State of Chihuahua.

Destruction of sprout and volunteer cotton.--For the last several years a stalk-destruction campaign has been conducted in south Texas immediately after the harvesting of the cotton crop as a control measure looking to the eradication of the pink bollworm from that area. In the lower Rio Grande Valley climatic conditions are favorable to the growth and fruiting of cotton throughout practically all of the year, therefore it is necessary to enter into a second phase of field clean-up operations immediately following completion of the initial stalk-destruction program. This consists in preventing sprout cotton, which develops from roots and other parts of the cotton plant left in the ground after plowing out the stalks, from maturing fruit on which the pink bollworm may maintain itself. A vigorous campaign was therefore begun in an effort to get the farmers back into the fields and, on the whole, cooperation has been good. In addition to approximately 95,000 acres of cotton land that has been replowed by the farmers, between 29 and 35 grubbing crews operated intermittently during November, removing scattered sprout and seedling cotton that had not been killed through plowing operations or had developed after the land had been replowed. Plants on abandoned acreage or growing in out-of-the-way places are also being removed. The grubbing crews spread out over the area systematically, taking out all the fruiting cotton as they come to it. At the end of November almost all of the 220,000-acre area had been covered by the crews; notwithstanding, the objective of this Division, to bring about a complete host-free period for the pink bollworm, had not been realized, as in some areas a limited quantity of fruiting cotton still remained. This condition is attributed principally to the fact that the sprout-destruction work was hindered to a considerable extent throughout November on account of excessive rains, preventing farmers and grubbing crews from reworking the fields. The amount of sprout cotton in the lower Rio Grande Valley of Mexico was reduced considerably during the last part of November, and at the end of the period there was very little acreage on which there were any fruiting plants. In all of this lower valley area, on both the Mexican and American sides of the Rio Grande, there is much less sprout cotton than ever before at this time of the year. New growth will, of course, continue to appear, and all of this area must be continually watched throughout the season in order to maintain a starvation period for the pink bollworm until the fruiting of the 1941 crop. Only about 3 weeks are required from the time some sprouts first appear until fruit is formed.

Stalk destruction.--Excessive rain during October prevented the completion of the original stalk-destruction program in the Coastal Bend district, and on account of intermittent rains and misty weather throughout most of November, approximately 600 acres of cotton stalks remained standing at the close of the period; also, some sprout plants and seedlings have developed. Most of the farmers in that area are anxious to complete the stalk-destruction work and replow their land in order to conserve the moisture and destroy any sprout or seedling plants. Consequently, it is expected that field clean-up in that area will be completed as soon as weather conditions will permit.

Wild-cotton eradication.--Pink bollworm infestation was found in domestic cotton plantings in northern Florida in 1932. Following the determination that the source of this destructive cotton insect was infested wild cotton plants growing in southern Florida and on adjacent keys, a campaign was begun to eradicate the pink bollworm by destroying its host plant. This undertaking has been continued to the present time with outstanding results. Twelve W. P. A. crews, aggregating an average of 90 workers, were engaged throughout November in wild-cotton-eradication work. Two Bureau crews, consisting of 8 men, started eradication work around the middle of November. These crews live on houseboats and work in remote areas. In the Bradenton-Fort Myers subdistrict first cleanings of the season were completed during the month in Pinellas, Hillsborough, Manatee, and Sarasota Counties. In addition to the destruction of all wild cotton plants, the crews have been engaged in clearing vegetation from wild-cotton colonies in this area in order to stimulate the germination of wild cottonseed. The first cleaning of the Key Largo, Matecumbe, and Long Key sections was completed the latter part of November. Work in these areas was accelerated during the first cleaning of this season, owing to the presence of numerous work- and turn-trails which were completed last season. In other sections of the Bradenton-Fort Myers and Keys subdistricts first cleanings of the season were still in progress. The 2 houseboat crews are operating on the Dade County mainland immediately to the east and to the west of the main Cape Sable area. Considerably fewer wild-cotton plants are being found in most of these areas than were present last season. In all of the above area only 139 plants with mature bolls were found in November. A total of 91,160 seedling and 127 sprout plants were destroyed.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Curly-top damage to tomatoes decreased by use of cheesecloth covers.--H. E. Dorst, of the Logan, Utah, laboratory, reports the results of an experiment conducted during the summer of 1940 on replicated small plots of tomatoes to determine the protection afforded early and late transplanted tomatoes from curly top, a virus disease transmitted by the beet leafhopper (*Eutettix tenellus* (Bak.)), by covering the plants with cheesecloth protectors during the early part of the season to prevent the incoming leafhoppers from feeding on them. He found that this protection materially reduced the percentage of tomato plants infected with curly top at the close of the season on September 17, and it also increased the yield of tomatoes. The results from this study are summarized as follows:

Period of plant protection by cheesecloth covers	Plants having curly top September 17	Yield per acre
	Percent	Tons
Early planting date (April 25):		
Apr. 25 to June 17 (all influxes of leafhoppers)	23.3	7.9
Apr. 25 to June 3 (early influxes of leafhoppers)	48,3	7.9
May 17 to June 17 (late influxes of leafhoppers)	33.0	6.6
No cheesecloth covers used	65.2	5.7
Late planting date (May 10):		
May 10 to June 17 (all influxes of leafhoppers)	16.3	8.0
May 10 to June 3 (early influxes of leafhoppers)	37.1	7.9
May 17 to June 17 (late influxes of leafhoppers)	26.9	7.2
No cheesecloth covers used	60.0	4.3

These data show that considerable protection from curly-top infection and damage was afforded both early and late transplanted tomatoes from the use of cheesecloth protectors when the tomatoes were covered from the time of transplanting until influx from migration by the leafhopper was completed on June 17. They also indicate that the protection from curly-top infection was greater on those plants covered during the late influxes of leafhoppers, but that the yield was greater on those covered during the early influxes. The data indicate further that the yield of unprotected tomatoes was greater for those transplanted early than for those transplanted late, even though curly-top infection was most prevalent at the end of the season on the early tomatoes. The protector used consisted of 1 square yard of cheesecloth supported over the tomato plant by 2 galvanized wire loops 42 inches long, placed at right angles to each other, so that the cloth formed a hot cap over the plant. Each of the 8 treatments was replicated on 8 plots, there being a total of 64 plots arranged in a systematic square. Each plot was 24.5 feet by 28.0 feet, and comprised 7 rows of 8 plants each, the distance between rows and hills being 42 inches.

Ingredients of "dynamite" spray less effective than complete mixture against narcissus bulb fly.--Ralph Schopp, P. M. Eide, and E. S. Bonn, of the Sumner, Wash., laboratory, conducted 2 series of tests on small replicated plots of narcissus to determine the effectiveness of the various ingredients of the "dynamite" spray in preventing infestation of narcissus bulbs by Merodon equestris (F.). They report that, although the various ingredients of this treatment have some effectiveness, none was so effective as the complete spray formula. "Dynamite" is an oil emulsion-in-water spray to which lead arsenate has been added at the rate of 6 pounds to 100 gallons of finished spray. The stock emulsion, by volume, consists of 76 percent light summer oil, 18.76 percent water, 3.8 percent oleic acid, and 1.44 percent triethanalamine; and the finished spray contains 5,000 cc., or 1.32 gallons, of the emulsion to each 100 gallons of water. In these tests the ingredients of the "dynamite" spray were tested singly and in various combinations at the same concentrations as used in the complete formula, with the following results.

Treatment	Bulbs infested	Reduction of infested bulbs
	Number	Percent
Series I:		
Complete dynamite spray	49	71.2
With lead arsenate omitted	95	44.1
With oil omitted	131	22.9
With oleic acid and triethanalamine omitted	82	51.8
Untreated	170	----
Series II:		
Complete dynamite spray	88	56.0
Spray containing mineral oil only[1]	150	25.0
Spray containing oleic acid and triethanalamine only	172	14.0
Spray containing lead arsenate only	226	-13.0
Untreated	200	----

[1] Emulsified by mixing 100 gm. of a sodium salt of alkyl ester of sulfosuccinic acid for each 1,520 cc. of raw oil.

These data show that infestation of narcissus bulbs by the narcissus bulb fly was less when the complete "dynamite" spray mixture was used than when the individual ingredients of the mixture were used or when the ingredients were used in various combinations. The treatments of each series were compared in 2 localities on a randomized-block arrangement of plots, there being 5 replications of each treatment at each locality. A plot consisted of a 200-foot-long row of bulbs. There was but 1 application of each treatment, made with a power sprayer at a rate of 35 gallons of spray to 1,000 feet of row. Application of all treatments was made during the period May 3 to 7, and the counts of infested bulbs were made when the bulbs were dug in the fall. The numbers of narcissus bulbs infested by the narcissus bulb fly were determined at digging time by examining 3 samples of 100 bulbs in each plot, 1 sample dug from the middle and 1 toward each end of the plot.

Natural mortality of young wireworm larva.--K. E. Gibson, of the Walla Walla, Wash., laboratory, from quantitative sampling of the soil designed to determine the amount of natural reduction in infestation of wireworm larvae, principally *Limonius canus* L., reports that natural mortality was very high under field conditions during the first few months after hatching. The reduction varied greatly in soil planted to different crops. The percentages of reduction in numbers of the young, living larvae, during a 2½-month period for various crops were: Lima beans, 100; carrots, 88; potatoes, 74; clover, 72; onions, 68; sugar beets, 54; corn, 46; fallow, 39; alfalfa, 32; and wheat, 13. These percentages were obtained by comparing the infestations of young larvae soon after hatching, early in July, with those found in the same plots late in September. The sample in each plot for each sampling period consisted of 20 units of soil 1/16 square foot in area and 12 inches deep, the numbers of young wireworm larvae in each being determined by means of a soil-sample washer. At Walla Walla there were 3 plot replicates of each of the 10 crop conditions, while at Prosser there were 8 plot replicates of alfalfa, corn, potatoes, sugar beets, and wheat, making a total of 70 plots.

Psyllid yellows probably not caused by feeding of adult psyllid.--The indications obtained from a series of tests conducted by R. L. Wallis, of the Scottsbluff, Nebr., laboratory, are that the psyllid yellows symptoms of tomato and potato probably did not result from feeding by adults of the tomato psyllid (*Paratrioza cockerelli* Sulc.). During the period July 1 to August 16 a total of 15 tomato and 10 potato plants were exposed individually in indoor cages for periods of 4 to 8 days. In each cage there were from 300 to 400 adults of the potato psyllid. After exposure the plants were removed, half of them thoroughly dusted with sulfur, and all were set outside for further observation. No symptoms of psyllid yellows developed on those plants which, after being fed upon by the adult psyllids, had been dusted with sulfur; but slight symptoms developed on the untreated plants that had been fed upon by the adult psyllids and later by nymphs, which had developed from eggs laid by the adults.

Unusual infestation of cabbage aphid.--R. E. Campbell, of the Alhambra, Calif., laboratory, recently reported an unusual infestation of *Brevicoryne brassicae* (L.), observed during the last summer on cabbage near San Juan Capistrano, Calif. Although it was an extremely heavy infestation, the outward appearance of the cabbage was very good. The aphids were established not only on the heads but also underneath several layers of the white, tightly fitting leaves of the cabbage heads. The entire surface of the head between these two or three layers of leaves was a mass of the aphids. In an attempt to control the aphids, the grower had stripped back the infested layers and applied a spray; however, the infestation was so far within the heads that poor control was obtained and most of the heads were not marketable. Four dust applications had been made during the growing period but, because of winds blowing most of the time, they had not been sufficiently effective; consequently, the aphids worked inside the cabbage heads, where neither sprays nor dusts could reach them.

Toxicity of insecticide to pepper weevil.--Mr. Campbell has reported the results of small-scale toxicity tests in which a large number of materials were used as dusts against *Anthonomus eugenii* Cano on caged pepper plants in the field. Of the dusts tested none proved so effective as calcium arsenate and cryolite. From a large number of replications the percentages of weevil mortality resulting from treatment with calcium arsenate, from cryolite containing 70 percent sodium fluoaluminate, and cryolite containing 50 percent sodium fluoaluminate were 90, 87, and 80, respectively. Of the other dusts used in these tests the only one showing much promise was one of the coded materials, which gave 77 percent of weevil mortality. Using a precision duster 1 gram of insecticide was applied to each pepper plant, which during application was covered with a large cone to confine the dust to a single plant. After a few minutes the cone was removed, a screen cage placed over the plant, and 10 living weevils per cage were introduced. The soil at the base of each plant was covered with cloth to prevent the escape of test insects and to aid in their recovery.

Parasite of asparagus beetle abundant.--C. W. Getzendaner and R. S. Wright, of the Puyallup, Wash., laboratory, report that the parasite Tetrastichus asparagi Crawf. was very abundant late in August and early in September in fields infested with Crioceris asparagi (L.). This parasite, which was first released near Puyallup in 1936, has become established and appears to be generally distributed throughout the Puyallup-Sumner district. About 1,550 adults of the parasite were collected from 1 field on August 22 in about 3½ hours. In this field there was considerable new growth of young asparagus and the asparagus beetles were congregating on it and ovipositing. The parasites were present in greater numbers and were destroying the beetle eggs as fast as they appeared. No fields were found where the beetle larvae were sufficiently abundant for rearing the parasite where the parasite was known to be present. The low host infestation during much of the season appears to be due in a large part to the efficiency of the parasite. A survey of asparagus fields outside of the Puyallup-Sumner district in which parasites were released in 1939 showed them to be present at Kent and Orting.

INSECTS AFFECTING MAN AND ANIMALS

Small yellow jacket feeding on stableflies.--W. E. Dove and his associates at the Panama City, Fla., laboratory, report that Vespula squamosa Drury has been feeding on dog flies (stableflies) about cattle. As many as 15 to 20 were noted hovering about a group of 4 animals. There has been a noticeable decrease in the stablefly population about these animals and, according to Mr. Dove, part of this is undoubtedly due to these predators.

Stableflies in South Carolina.--Mr. Dove and S. W. Simmons visited several points along the South Carolina coast in the vicinities of Charleston and Georgetown, where an outbreak of dog flies was reported last season. The marine grasses commonly found in the vicinity of Panama City did not occur in this area. It is evident that the dog fly problem in this area is entirely different from that encountered on the west coast of Florida. According to Mr. Dove, the indications suggest that the moist areas which receive seepages of salt water during high tides may be concerned in the production of the Carolina outbreaks.

Stableflies along Florida coast line.--During the first week in November Mr. Simmons made a survey of the littoral territory along the Gulf and Atlantic coasts of Florida. The purpose was to determine the limits of the area infested by dog flies, the extent of breeding, the materials in which breeding occurs, and the factors responsible for greater or lesser fly outbreaks. It was found that dog fly outbreaks occur along the Florida Gulf coast as far south as Homosassa. With this point as the eastward limit, and Mobile, Ala., as the westward limit, there is an infested area along the Gulf coast of about 400 miles. The greatest breeding is found along the 200-mile shore line between Pensacola and Carabelle, Fla. South of Homosassa dog flies present no problem. According to Mr. Simmons, the principal limitation to dog fly breeding along the southwestern Gulf coast and the Atlantic coast of Florida is the lack of suitable bay beaches for tide-drift deposits of bay grasses.

Mosquito survey of naval air base at Cocoa, Fla.--At the request of Commander Tollefson, of the Naval Air Base at Cocoa, Fla., Mr. Dove and W. V. King met with the naval authorities at the Base early in November for the purpose of discussing mosquito control at that point.

Mosquito conference at New Smyrna, Fla.--At the request of Mr. Dove, the following personnel met at the New Smyrna Beach laboratory, where a 2-day conference was held on problems of mosquito biology: W. V. King, G. H. Bradley, B. V. Travis, S. W. Simmons, J. B. Hull, and S. E. Shields. Methods for obtaining samples of marsh soil for flooding samples to obtain hatching of eggs were demonstrated to the group by G. H. Bradley and B. V. Travis. Arrangements were made for Mr. Travis to introduce this method in Dade County so that needed surveys can be made by the county mosquito-control official.

Mansonia mosquitoes in South Carolina.--In answer to requests, W. V. King, of the Orlando, Fla., laboratory, visited health officials in South Carolina during the week beginning November 25 to locate the breeding places of *Mansonia* mosquitoes. Concentrated breeding was found in a small lake. As control measures, Mr. King advised the cutting of certain types of vegetation beneath the surface of the water and an application of an oil during the period when the mosquitoes were emerging.

Incidence of screwworms in Florida.--According to Mr. W. E. Dove, there were only a few cases in the western and northern counties of Florida during September. In correspondence directed to Mr. Dove, the county agents agreed that the incidence of screwworms was lower than at any time since this pest established itself in the Southeast.

New larvicide for control of goat lice.--O. G. Babcock, Roy Melvin, and C. L. Smith, of the Menard, Tex., laboratory, report that results from recent experiments indicate a new, practical dip may soon be developed which will kill 100 percent of the lice within a few hours, and all eggs with one treatment.

Ranch management in screwworm-prevention program.--E. C. Cushing, Menard, reports that the ranch-management program is well under way and that four district meetings of county agents were held at Uvalde, Beeville, Boerne, and Gonzales, Tex., on November 12, 13, 14, and 15, respectively. The proposed plan and its purpose were explained by Messrs. Cushing and W. L. Barrett, Jr. The meetings were well attended, and in addition to the county agents, a number of leading ranchmen and others were present. There were enough immature stages of the fly in the ground during December to develop a rather severe outbreak of the fly over the entire overwintering area should there be a considerable period of warm weather during the month of January. The essential recommendations included in the program include avoiding all wounds and dropping no young from October 1 to January 31; perform surgical operations, drop young, and shear as soon as possible after February first, when flies are few in number; avoid all wounds and drop no young during May, June, and July; and fall shear and emergency operations only in August and September. The peak of fly abundance is reached late in December in the overwintering area. If there are no wounds during this period the largest crop of flies of the year will die without a suitable place for oviposition.

Biological studies of horn flies.--According to W. G. Bruce, of the Dallas, Tex., laboratory, adult horn flies emerged from infested droppings placed in overwintering cages on October 7, 14, and 18, but none emerged since November 21. Records of 475 pupae, kept at a constant temperature of 85° F. ± 2°, showed the pupal period to be 127 hours, correct within 1 hour. An elephant dropping was infested with 100 newly emerged horn fly larvae and was kept in a room at 85° F. ± 2°, but no flies emerged.

FOREIGN PLANT QUARANTINES

More insects in crating.--Live scolytid larvae were found in elm wood used in open structure crates for earthenware arriving at New York during the latter part of October. The larvae were determined by W. H. Anderson as probably *Scolytus scolytus* F., based on determinations of associated adults made by M. W. Blackman. Cerambycid larvae, determined by Mr. Anderson as *Clytus arietus* L., were also found. This species is recorded by Sorauer as feeding on the larvae of bark beetles (Scolytidae) in fig trees and grapevines in southern France.

Entomological interceptions of interest.--The living adults of the bruchid *Bruchus tristiculus* Fahr. were intercepted at New Orleans on September 11 in sweet pea seeds in mail from Portugal. Two living larvae of the melonfly (*Dacus cucurbitae* (Coq.)) were taken at San Diego, Calif., on November 5 in string beans in stores from Hawaii. A living adult of the scolytid *Gnathotrichus consentaneus* Bldfd. was found at El Paso, Tex., on October 23 with sour limes in cargo from Mexico. Seven living larvae of the celery fly (*Philophylla heraclei* (L.)), were found at New York on October 1 in celery in stores from England. Ten living larvae of the Mediterranean fruitfly (*Ceratitis capitata* Wied.) were taken at San Pedro, Calif., on October 9 in coffee berries in baggage from Hawaii. A living adult of the curculionid *Ceratopus bisignatus* Boh. was taken at New Orleans on October 30 on banana in cargo from Mexico. One living adult each of the coreids *Agonosoma flavolineata* (Lap.) and *Plunentis porosus* Stal was intercepted at Hoboken, N. J., on October 29 in bromeliad leaves in baggage from Brazil. A living adult of the lygaeid *Acroleucus tullus* (Stal) was intercepted at Laredo, Tex., on October 28 on gardenia in cargo from Mexico. Living and dead specimens of the olethreutid *Laspeyresia splendana* (Hbn.) were taken at Philadelphia on November 13 in a bag of chestnuts in stores from Spain.

Pathological interceptions of interest.--Alternaria cucurbitae Let. was found September 25 at Seattle on squash (Cucurbita maxima) from Japan. Aphelenchus avenae Bastian was intercepted on November 19 at New York in Xanthosoma sp. roots from Cuba. Aspergillus ochraceus Wilhelm, intercepted on October 16 at New York, appeared to be responsible for a dry rot which was destroying a gladiolus corm from Turkey. Cercospora sp. was intercepted on October 20 at Laredo on husk tomatoes from Mexico. Cylindrosporium chrysanthemi All. was unusually prevalent at Brownsville on chrysanthemums being brought from Mexico during October and November, a total of 18 interceptions being made. Peronospora pisi (DeBy.) Syd. and Septoria pisi West. were found on November 24 at New York on peas from Chile. An undescribed species of Pratylenchus was intercepted on October 30 at New York in Lilium longiflorum bulbs from Cuba. Sclerotinia gladioli Drayton was intercepted on October 22 at San Francisco in gladiolus corms from Japan. Sphaeropsis sp., closely resembling S. malorum Pk., was intercepted on August 31 at Brownsville on pine cones from Mexico.

DOMESTIC PLANT QUARANTINES

Survey of Parlatoria chinensis.--A Federal-State survey is under way in Missouri to determine the extent of spread of a diaspine scale new to this country, specimens of which were submitted earlier in the year by Missouri inspectors and identified as Parlatoria chinensis Marlatt (see News Letter, dated June 1, 1940, v. VII, No. 6, p. 35). Investigations conducted by the Missouri Department of Agriculture during the summer resulted in finding a number of infested properties in the vicinity of the Missouri Botanic Gardens and Tower Grove Park in St. Louis. As this appears to be the first record of the occurrence of the scale in the United States and it is therefore not known to what extent it may become a pest of economic importance on ornamental and fruit plants, the State requested Federal assistance in making the survey. Eight Federal inspectors were assigned to the work early in December, under the supervision of William Dickison.

Grasshopper control, estimated savings and losses in crops.--From reports of State leaders in grasshopper control and from Bureau records it is estimated that the 1940 control program conducted in 22 States saved crops valued at more than 42 million dollars. These savings represent a net benefit of more than $22 for each Federal dollar expended. On the other hand, it is estimated that more than 22 million dollars of grasshopper damage was done to crops in these States. The comparison of savings and losses is encouraging, the ratio being more favorable than might be expected, considering the wide areas involved and the many factors concerned in control.

Grasshopper baiting in November.--Grasshopper baiting was continued to an unusually late date extending into the early days of November in the second-generation Melanoplus mexicanus Sauss. area of the southern Great Plains in the vicinity of the Panhandles of Texas and Oklahoma. Subsequent extreme low temperatures, however, dropped to 5° above zero at Amarillo, Tex. This condition, together with parasitization and other natural causes, resulted in almost complete destruction of live grasshoppers in the second-generation area.

Grasshopper and Mormon cricket control conference.--A conference was held in Denver on December 7-8 of Bureau representatives, State directors or commissioners of agriculture, directors of extension, State leaders, and representatives of the Extension staff from Washington. The conference heard discussions of recent research in grasshopper control and a historical resume of grasshopper outbreaks. A suggested outline of procedure and plan of operation for hopper and cricket control for the crop year 1941 was presented for discussion and met with approval.

Grasshopper and Mormon cricket egg survey.--Information obtained from egg surveys for both these pests in the autumn of 1940 indicates a general downward trend in the probabilities of infestation for 1941. The serious grasshopper outbreak of 1939 was materially reduced to a much less difficult problem in 1940 and the work of that year appears to have effected a corresponding reduction both as to areas and intensity.

Fall inspections of peach trees.--In cooperation with the States concerned, the predefoliation inspection as required under the provisions of the standard State quarantines on account of the peach mosaic was completed early in the month. Mosaic-infected peach trees were found in this inspection in New Mexico, Oklahoma, and Texas. At the request of and in cooperation with the Louisiana State officials, several nurseries that had not been inspected in the spring for the phony peach disease were inspected in the fall, and with one exception were found eligible for certification, as no phony trees were found in their environs nor in the nursery stock. Of the nearly 700 nurseries inspected during the year in the entire region infected with the phony or mosaic disease, only 18 were found to be ineligible for certification. These are located in six States.

Tree-removal work on peach projects.--Tree-removal work was conducted during the month in California, Colorado, Georgia, New Mexico, Tennessee, and Texas, with the main activities in California and Georgia. Eight thousand mosaic-infected trees were removed in California, leaving slightly more than 4,000 and the work continues to go forward in that area. Good cooperation is being received from the growers, with few exceptions. In Georgia more than 11,500 phony trees were removed during November and every effort is being made to complete the removal of the diseased trees prior to the arrival of severe weather. In the States mentioned from 400 to 500 W. P. A. certified workers were employed in the removal of diseased, escaped, and abandoned peach trees during the month.

Chinch-bug survey.--The Federal-State survey begun early in November, to determine the full status of the chinch bug infestations, was terminated at the close of the month in Missouri, Nebraska, and South Dakota, and continued into December in Indiana, Iowa, and Oklahoma. Surveys in Kansas, Ohio, and Illinois have been made by the departments of agriculture of those States.

Mole cricket damage subsiding.--Unusually dry weather throughout November in those parts of Florida in which mole cricket operations have been conducted, has minimized the damage resulting from the cricket infestations. Furthermore, most of the crops needing protection from the crickets have reached an advanced stage and it is felt that the seriousness of the situation which recently created an emergency requiring Bureau participation has greatly diminished. The demands for bait were light during the month, averaging approximately 103,000 tons of mixed bait per week, less than one-fifth the quantity distributed during the first week of operations. Bait was distributed in November in 12 counties. Mixing stations at Wauchula and Plant City were kept in operation during the entire month and a plant was set up at Palatka on November 8. The mixing plant located at Lakeland was discontinued on November 15.

Sweetpotato weevil eradication areas extended in Mississippi.--A cooperative observational survey of conditions affecting the sweetpotato weevil situation was conducted in November in the Gulf coast counties of Mississippi, at the request of Clay Lyle, State entomologist, and for consideration at the meeting of the State Plant Board held at State College on November 22-23. With the information obtained from the survey it was considered advisable to extend the eradication activities to these Gulf coast counties for the protection of the areas where cooperative eradication measures have been carried out in the commercial sweetpotato-growing areas of the State since 1937. Accordingly, arrangements are being concluded to start cooperative eradication work in the northern portion of these counties.

White-fringed beetle control work.--The November activities of the white-fringed beetle control project consisted mainly of repairing and overhauling field equipment, preparing individual records of premises concerned in the 1941 control program, and enforcing Federal and State quarantine regulations.

Pests intercepted by transit inspectors.--Three Japanese beetle larvae were recently found in a shipment of soil consigned from Alexandria, Va., to a point in Ohio outside the regulated area. The shipment was intercepted at Pittsburgh.

Transit-inspection facilities increased for Christmas shipping.--Transit inspection was recently resumed at Detroit through the cooperation of the Michigan State Department of Agriculture in the assignment of an inspector at this point. At Birmingham the assistance of an Alabama State inspector, working with the regular transit inspector, makes possible the inspection of all trunk lines, operating out of the white-fringed beetle area, which move materials into or through Birmingham.

CONTROL INVESTIGATIONS

The application of the aerosol to fumigation.--W. N. Sullivan and J. H. Fales, of the Beltsville, Md., laboratory, in cooperation with L. D. Goodhue, of the Division of Insecticide Investigations, are making studies on the application of the aerosol to fumigation. It has been shown by toxicity tests against the housefly that the effective period of dispersed naphthalene can be greatly increased by vaporization in the presence of an inert aerosol. It is apparent that absorption occurs and the insecticide is held in an effective form for a longer period. The presence of the inert particles changes the character of the deposit. The rate of crystallization is greatly retarded and the size of the crystal is reduced. Instead of the most of the naphthalene collecting on the floor, it was more uniformly deposited on all surfaces regardless of position.

Turf treatments with methyl bromide solution against Japanese beetle grubs.--H. C. Donohoe, White Horse, N. J., reports on the application by sprinkling of methyl bromide and alcohol (either methyl or ethyl) in aqueous solutions to lawn turf for the control of Japanese beetle grubs. Mr. Donohoe was assisted by G. F. Kerbey and H. A. Messersmith, of the Division of Japanese Beetle Control. Greatest survival was found in the top inch of soil. Mortality was greater in marginal dosages followed by a water cover than without this cover where used with solutions of 0.15 percent methyl bromide or over, and was lower with solutions of 0.10 percent or less followed by a water supplement than where none was added. Soil temperatures ranged from 53° to 63° F. at treatment application. Mortality within a schedule was generally less at higher than at lower temperatures where any difference occurred. At comparable schedules mortality was less in light sandy soil than in heavier loams.

INSECTICIDE INVESTIGATIONS

Dihydrorotenone.--Among the numerous derivatives of rotenone thus far studied, only dihydrorotenone retains the high insecticidal action of the parent compound. The apparently greater stability of this derivative has led to its commercial production. Catalytic hydrogenation of rotenone produces, in addition to dihydrorotenone, the nontoxic hydrogenation products--rotenonic acid, dihydrorotenonic acid, and dihydrorotenol. To develop a method for the determination of dihydrorotenone in the mixture of hydrogenation products, some of the physical and chemical properties of these compounds were examined. A combination of physical properties will give some information as to the amount of dihydrorotenone present, but a better method is based on the observation that this is the only reduction product giving an appreciable red color by the Goodhue test. L. D. Goodhue and H. L. Haller, of the Division of Insecticide Investigations, have proposed a method based on this test which is described in Industrial and Engineering Chemistry (Analyt. Ed., v. 12, No. 11, pp. 652-654, November 1940).

Laboratories moved to Beltsville, Md.--During October and November the laboratories of the Division of Insecticide Investigations, which, since the summer of 1935, had been located on the first floor of the first wing of the Department's South Building, were moved to a new building in Beltsville, Md., known as the South Laboratory Building. This building, planned to house the pharmacological and vitamin units of the Food and Drug Administration before it was transferred from the Department of Agriculture to the Federal Security Agency, is now occupied by the various units of the Department of Agriculture. The Division of Insecticide Investigations is located on the first floor of this building, where the laboratories of the Insecticide Division of the Agricultural Marketing Service will also be located shortly. The new quarters in the South Laboratory Building afford more space to each chemist than was available in Washington, D. C. Moreover, the new location, being only 1 mile from the Entomology Building of this Bureau, will enable the chemists and entomologists to confer frequently on problems that are being attacked jointly.

BEE CULTURE

Carbohydrate metabolism of developing honeybee.--R. M. Melampy, of University, La., reports: "During the larval feeding stage of the worker honeybee (Apis mellifera L.), the total carbohydrate and the glycogen increase. The total carbohydrate includes free reducing sugar of the tissues, unassimilated carbohydrate of the alimentary tract, glucose produced by the hydrolysis of glycogen, and other carbohydrates convertible by acid hydrolysis into reducing sugar. The maximum storage of total carbohydrate and glycogen occurs between the fifth and sixth days, which is approximately the end of the larval feeding period and the time the cell is sealed. The total carbohydrate at this time is 100 mg. and the glycogen 68 mg. per gram of tissue; however, 12 days later the total carbohydrate has decreased to 9 mg. and the glycogen to 0.9 mg. per gram. If it may be assumed that the daily rate of utilization is constant, the total carbohydrate decreases at the rate of 8 mg. and the glycogen at the rate of 6 mg. per gram per day. It is of interest that the synthesis and utilization of total carbohydrate and glycogen parallel each other throughout the life cycle. However, the glucose due to the hydrolysis of glycogen varies at different stages of development. For example, at the 3-4 day stage it comprises 42 percent of the total carbohydrate, at the 5-6 day stage 68 percent, and at the 17-18 day stage 10 percent. At no time does the free reducing sugar make up the difference existing between the total carbohydrate and glycogen. The greatest difference is 32 mg. per gram of tissue at the 5-6 day stage, but at this time the free reducing sugar is only 1.0 mg. per gram. The free reducing sugar decreases to 0.3 mg. per gram at the 6-7 day stage, rises to 2.0 mg. per gram by the 16-17 day stage, and decreases before emergence. It is clearly shown, from the results presented here, that some other form of carbohydrate other than glycogen and free reducing sugar must be present in the developing honeybee. This carbohydrate is convertible, by acid hydrolysis, to reducing sugar."

Home-made beeswax candles.--A revival of the art of making beeswax candles at home in old-fashioned molds is evidenced, as these hand-molded candles are in demand among persons interested in antiques. Beeswax is also extensively used in high-grade commercial candles. Such candles have sufficient rigidity to stand up well in the heat of summer, a quality not possessed by ordinary candles made of parawax. Beeswax candles are made commercially by dipping, rolling, or pouring. The beeswax must be very clean and quite clear, when in the liquid phase, to be satisfactory for candle making. Mr. Vansell, of the Pacific States Bee Culture Field Laboratory, has studied candle making and has found that careful attention must be given to temperature control when molding beeswax candles. The temperature of the liquid wax should not exceed 155° F. when placed in the mold. Beeswax is adhesive and must be very slowly cooled to prevent it from sticking too tightly, or from cracking through shrinkage. When candles are only slightly stuck to the mold they may be satisfactorily removed after thorough chilling by a dash of boiling water applied along the metal tube wall. Commercial wicks are recommended.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

A cerambycid destroying pricklypear in Colorado.--Specimens of a cerambycid beetle, identified by W. S. Fisher as Moneilema annulatum Say, were recently received from the Colorado State College accompanied by the report: "This insect is completely wiping out stands of pricklypear in pasture land in the vicinity of Fountain, Colo." Cactus stands in other parts of the State, however, appear not to be severely attacked.

A European moth in North America.--In the course of making identifications of moths associated with studies on the Dutch elm disease, the apparent similarity between English specimens of Oecophora lunaris (Haworth) and a series of two males and three females from the State of Washington was noted. Further investigation and a comparison of the male genitalia of these with the English specimens and other European material proved them to be identical. The Washington specimens were collected at Bonneville and Vancouver, Clark County, from June 26 to July 7, 1931, by J. F. Gates Clarke. It is possible that this species has been present in the vicinity of Vancouver since early in the days of the settlement of the English on the Columbia River. Apparently this is the first record of this species in North America. Probably the insect is of no economic importance, for, like several related forms, its larval stage feeds under loose bark, presumably as a scavenger.

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